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(54) Snowplow and Implement Attachment Means for a Vehicle

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SNOWPLOW AND IMPLEMENT ATTACHMENT MEANS FOR A VEHICLE

BACKGROUND OF THE INVENTION

This invention relates to articulated snowplows,
and to means for attaching snowplows to motor vehicles.

5 Plows with blades which articulate or hinge have a
number of advantages over plows with straight, nonpivotal
blades. In deep snow, a lightweight vehicle carrying a
plow, such as a jeep or pickup truck, often cannot push snow
with a straight blade. The wheels of the vehicle will spin
10 when the resistance of the deep snow is encountered. With a
hinged blade, however, in a forwardly extending V
configuration, the same deep snow can be pushed to either
side of a lightweight vehicle, and the vehicle will not get
stuck.

15 A straight bladed plow also makes it virtually
impossible to push an entire pile of snow to an
out-of-the-way location since the snow will spill out either
side of the plow. However, a hinge plow can be articulated
to a rearwardly extending V position such that a pile of
20 snow can be cupped between the two blade portions and pushed
without significant spillage.

 A problem encountered with many prior art hinged
plows, however, is that the hinge cannot withstand the
severe stresses which occur when objects such as curbs,
25 rocks and the like buried beneath the snow are struck. In
many prior art designs, the hinge bends or fails after
repeated strikes, making it difficult or impossible to
articulate the blades. Another problem is with the
complicated mechanical design used in many hinge plows.
30 Such complexity leads to costly repairs.

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SUMMARY OF THE INVENTION

The present invention is a hinged snowplow wherein a support assembly, preferably a cowling, is pivotally secured to the free end of the support frame which attaches to the vehicle such that the cowling pivots in a generally vertical plane about the free end of the frame. The blades of the hinged snowplow are hinged to the cowling. A first stop is connected to the cowling and is engageable with the support frame to limit pivotal movement of the cowling and plow blades about the frame to a first or normal plowing position. A second stop, connected with the cowling and engageable with the support frame, limits the pivotal movement of cowling and plow blades about the frame to a second position so that the cowling and the blades can pivot as a unit only between the two positions. This allows a rock or other object to pass underneath the blades if the blades strike such an object. Trip bias means between the frame and the cowling bias the cowling and the blades to the first position where the blades are positioned for plowing. When an object is struck, the blades move toward the second position against the bias means as limited by the second stop.

In other aspects, the invention includes a quick-disconnect attachment for connecting the plow support frame to a vehicle. Such attachment includes first and second cooperating hitch means, one on the vehicle and the other on the plow support frame. One of the hitch means includes at least one projection, while the other has a slot receiving the projection. A movable pin on one hitch means, controllable from a remote location such as the cab of the vehicle, locks behind a fixed rod on the other hitch means to retain the plow support frame to the vehicle.

1 Preferably, the projection forms a second slot which
receives the fixed rod, the rod extending across the first
of the slots. The movable pin extends across the second
slot.

5 In yet another aspect, the support frame for the
plow is formed in a T-shape with the arm or cross of the T
closest to the vehicle. The free end of the leg of the T
supports the hinged plow. Preferably, the trip bias means
is connected between the arm of the T and the cowling which
10 is supported at the free end of the support frame.

The cowling provides a strong, localized
reinforcement for the hinge so that the hinge can resist
repeated strikes of buried objects without bending or
failing. Furthermore, the cowling allows attachment of the
15 fluid cylinders which position the plow blades and the
biasing mechanism for the trip bias means, and is relatively
simple in mechanical design so that it is very economical to
manufacture. The attachment allows easy connection and
removal of the entire plow to and from a vehicle without
20 leaving the driver's seat. The support frame provides
improved strength for the plow, while allowing all necessary
plow movement.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of a vehicle having
25 the snowplow of the present invention attached;

Fig. 2 is a top plan view of the snowplow of the
present invention;

Fig. 3 is a rear, detailed, exploded perspective
view of the hinged snowplow of the present invention;

Fig. 4 is a side view of the snowplow of the present invention with the blade in the normal, untripped, plowing position;

Fig. 4A is a sectional view of the snowplow taken along line IVA-IVA of Fig. 4;

Fig. 5 is a side view of the snowplow with the blade in the tripped position;

Fig. 6 is a top plan view of the snowplow with the plow blades positioned in a forwardly extending V configuration;

Fig. 7 is a top plan view of the snowplow of the present invention with the plow blades in a rearwardly extending V configuration;

Fig. 8 is a top plan view of the snowplow of the present invention with the plow blades aligned but rotated to an angled position;

Fig. 9 is a side view of the attachment hitch for the snowplow of the present invention; and

Fig. 10 is a detailed, top plan view of the attachment hitch of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The snowplow 10 of the present invention includes a blade 12 made of two half blade sections 14, 14' which are hinged together at a generally vertical hinge 16 mounted on a support assembly, in the following referred to as cowling 18. Cowling 18 is pivotally mounted for horizontal pivotal movement on the free end of a T-shaped support frame 20. Frame 20 is releasably mounted on a vehicle such as a pickup truck 22 by means of a first hitch 24 attached to support frame 20 and a second hitch 26 mounted on the vehicle.

1 Blade 12 and its half sections 14, 14' are in the
configuration of a standard, articulated, rectilinear plow
and need not be described in great detail. Each blade half
is reinforced in the conventional manner and has downwardly
5 extending skid cups 28, 28' which support the ends of blade
12 while the plow is being pushed by vehicle 22 across a
surface to be plowed. Blade sections 14, 14' are hinged
together and hingeably attached to the apex 30 of cowling 18
by a hinge 16. Hinge 16 includes two hinge flanges 32, 32'
10 each of which is welded to one of the half blade sections
14, 14'. Each hinge flange has a series of annular hinge
collars or bushings 33, 33' (Fig. 4) which receive a
connecting hinge pin 76 to interfit and alternate with one
another and provide hinged blade movement.

15 Each half blade section 14, 14' is independently
pivotal about hinge 16 by means of fluid cylinders 34, 34'
(Figs. 2 and 6-8) which are preferably single-acting
hydraulic cylinders. Each cylinder 34, 34' is connected to
its half blade section by a tab 36, 36' welded to the back
20 of half blade sections 14 and 14'. The other end of each
hydraulic cylinder 34 is pivotally mounted on cowling 18 in
a manner to be described. Cylinders 34 are each connected
to a conventional source of pressurized fluid on the
vehicle, such as a hydraulic pump (not shown), via
25 fluid/hydraulic lines 35, 35' and are controlled by
conventional fluid/hydraulic valves (not shown) operable
from the vehicle cab in the conventionally known manner.

Blade sections 14, 14' are independently
retractable and biased rearwardly by means of retraction
30 springs 38, 38' which allow the blade to assume the
rearwardly angled positions illustrated in Figs. 6 and 8

1 when fluid is exhausted from cylinders 34, 34'. Retraction
springs 38, 38' are attached to blade sections 14, 14' by
brackets 40, 40' welded near the tops of the backs of the
blades. Retraction springs 38, 38' are connected to
5 brackets 40, 40' by eyebolts 41, 41' which can be threaded
into or out of brackets 40, 40' to adjust the tension of
springs 38, 38'. Retraction springs 38, 38' are connected
at their other ends to the top of cowling 18 (Fig. 4) in a
manner to be described.

10 The primary component of cowling 18 is a V-shaped,
one-piece stamping 42 having two apex plate portions 44, 44'
(Fig. 4A) which form an elongated, vertically extending apex
30 when blade 12 is in the untripped position (Fig. 4).
Apex 30 supports hinge 16 throughout its entire length. A
15 bushing 31 (Figs. 3 and 4) is welded to the center of apex
30 to receive hinge pin 76 for connecting the center of
cowling 18 to half blade sections 14, 14'. Stamping 42
further includes two parallel wall portions 46, 46' which
extend rearwardly from apex plate portions 44, 44'. Each of
20 the parallel wall portions has a downwardly sloped upper
rear edge 48 and a curved lower rear edge 50.

Bushings 52, 52' (Figs. 3 and 4A) are positioned
along the lower, forward part of each parallel wall portion
46, 46' to receive a pivot rod 54 (Figs. 3, 4 and 5) which
25 forms a horizontal pivot axis to allow the trip motion
described below and pivotally secures the free end of
support frame 20 to cowling 18 between the parallel wall
portions 46. Also extending between parallel wall portions
46 above rod 54 is an attachment rod 56 to which the trip
30 bias mechanism 58 is attached for biasing cowling 18 and

1 blade 12 to the vertical position shown in Figs. 2, 4 and
6-8.

5 A stop plate 60 is also positioned transversely
between and welded to parallel wall portions 46, 46' also
above rod 54 but below rod 56. Stop plate 60 abuts against
the upper surface of the free end of support frame 20 when
cowling 18 is in the vertical position, forming a stop
preventing further rearward pivoting of cowling 18 and blade
12 beyond their vertical position illustrated in Fig. 4.
10 Stop plate 60 has a slot 62 (Figs. 3 and 4A) which opens
rearwardly and receives turnbuckle 64 of trip bias mechanism
58 when blade 12 and cowling 18 are tripped as shown in Fig.
5.

15 Two buttress plates 66, 66' (Figs. 3, 4 and 4A)
extend between stop plate 60 and attachment rod 56 to
buttress attachment rod 56 against bending by trip bias
mechanism 58. The two buttress plates 66, 66' are separated
by a gap 68 through which turnbuckle 64 passes when cowling
18 and blade 12 are in the fully tripped position
20 illustrated in Fig. 5. Furthermore gap 68 allows
turnbuckle 64 to be hooked onto attachment rod 56 (Fig. 4A).

Cowling 18 further includes a top plate 70 which
covers the top of cowling 18 between plate portions 44 and
wall portions 46. Top plate 70 has two spaced openings 72,
25 72' near its rear edge to which the interior ends of
retraction springs 38, 38', respectively, are attached. Its
forward end includes an aperture 73 in a forwardly
projecting flange for receiving hinge pin 76 for connecting
the top of cowling 18 to the half blade sections 14, 14'.
30 Mounted on top plate 70 is a locking plate 74 which is
bolted to the top of top plate 70 with bolt 71 and abuts

1 against a flange 75 (Fig. 4) spaced below the top of hinge
pin 76, which pin extends the entire length of hinge 16.
Locking plate 74 prevents pin 76 from working out of hinge
16 as the blades are repeatedly articulated.

5 Cowling 18 further includes a bottom plate 78
which covers the bottom of cowling 18 between plate portions
44 and wall portions 46. Bottom plate 78 includes a recess
or slot 80 along its rear edge which accommodates the free
end of support frame 20 when cowling 18 and blade 12 are
10 tripped as shown in Fig. 5. Slot 80 receives the free end
of support frame 20 so that bottom plate 78 will not
interfere with the full pivotal movement of cowling 18 about
support frame 20 to the fully tripped position illustrated
in Fig. 5. The forward end of bottom plate 78 includes an
15 aperture 79 in a projecting flange which receives the bottom
end of hinge pin 76 and connects the bottom of cowling 18 to
the half blade sections.

 Cowling 18 also has a curved rear plate 82 which
conforms generally to the shape of the upper rear edges 48
20 and curved lower edges 50 of parallel wall portions 46.
Rear plate 82 extends from top plate 70 to bottom plate 78,
and also extends between and beyond parallel wall portions
46 forming outwardly extending wings or flanges 84, 84'
(Fig. 4A) on either side of the rear cowling. Flanges 84
25 and 84' reinforce parallel wall portions 46, 46' and engage
reinforcing gussets 87, 87' as will be described below.

 Rear plate 82 has an enlarged opening 86 which
extends from stop plate 60 down to bottom plate 78 which is
as wide as the width of the free end of support frame 20.
30 Opening 86 allows cowling 18 to pivot from the first,
vertical position illustrated in Fig. 4 to a second, tripped

1 position illustrated in Fig. 5. Extending upwardly from
open... 82 is a turnbuckle slot 88 (Figs. 2, 3 and 4A)
through which turnbuckle 64 extends. Slot 88 opens to
opening 86, permitting turnbuckle 64 to move into opening 86
5 when the cowling pivots to the fully tripped position.

Welded to the exterior surface of each parallel
wall portion 46, 46' are a pair of spaced, horizontal
gussets 87, 89 and 87', 89' (Fig. 3). Each pair of gussets
extend from a bushing 52 or 52' rearwardly to one of the
10 flanges 84 or 84'. Flanges 84 and 84' are also welded to
gussets 87, 89 and 87', 89', respectively. Gussets 87, 89
and 87', 89' reinforce parallel wall portions 46, 46'
between bushings 52, 52' and flanges 84, 84' in order to
strengthen those parts of wall portions 46, 46' which will
15 be under the greatest stress when snow is plowed because the
force of plowing will be transmitted through pivot rod 54
and bushing 52 to frame 20.

Support frame 20 (Figs. 2, 3, 6-8 and 10) includes
a T-frame 90 with a forwardly extending leg portion 92 which
20 is perpendicular and welded to an arm or cross portion 94.
Gussets 96, 96' extend between leg portion 92 and arm
portion 94 to reinforce T-frame 90. Leg portion 92 extends
forwardly beyond gussets 96, forming the free end 98 of
support frame 20 which extends into and is pivotally secured
25 to cowling 18.

Extending rearwardly from arm portion 94 are two
pairs of side ears 100a, 100b and 100a', 100b', and a pair
of central ears 102, 102'. Each pair of ears 100a, 100b is
identical to the other, so only one will be described in
30 detail. Ear 100a is an extension of a side plate welded
over the end of arm portion 94 and extends rearwardly

1 therefrom. The rear end of ear 100a terminates in an
outwardly flared, angled end 104 (Fig. 10). Ear 100b is
spaced inwardly from ear 100a and terminates in a flared,
inwardly bent end 106 which projects in a direction away
5 from flared end 104 of ear 100a. Thus, flared ends 104 and
106 of ears 100a and 100b form an enlarged opening 108 to a
slot 110 formed between ears 100a and 100b.

Extending parallel to an entire length of arm
portion 94 and through ears 100a, 100b, 100b' and 100a' is a
10 retaining rod 112. Ears 102, 102' are positioned
intermediate the ends of retaining rod 112 and extend
between the center portion of retaining rod 112 and arm
portion 94 to reinforce retaining rod 112 against bending in
its middle. Ears 100a, 100b, 100b' and 100a' and retaining
15 rod 112 form first hitch 24.

Mounted on the vehicle 22 is second hitch 26 which
includes a mounting bar 116 to mount hitch 26 on the
vehicle, preferably to the chassis of the vehicle.
Extending forwardly from mounting bar 116 are two spaced
20 projections which provide catch assemblies 118, 118', each
of which is identical to the other, so only one will be
described. Projection or catch assembly 118 includes a top
plate 120 (Figs. 9 and 10) which is welded to the top of
mounting bar 116 and extends forwardly therefrom. A bottom
25 ear 122 is welded to and extends forwardly from the bottom
of mounting bar 116 and terminates in a downwardly angled
flared end 124 (Fig. 9). An upper ear 126 is welded to
mounting bar 116 intermediate top plate 120 and bottom ear
122. Upper ear 126 includes an upwardly angled portion 127
30 (Fig. 9) which angles away from the flared end 124 of bottom
ear 122. The forward end of angled portion 127 is welded to

1 the forward end of top plate 120. Angled portion 127 and
flared end 124 form an enlarged mouth 130 leading to a slot
132 formed between bottom ear 122 and upper ear 126. A
support block 128 (Figs. 9 and 10) is positioned between
5 upper ear 126 and bottom ear 122 and is welded to the two
ears as well as mounting bar 116 to reinforce hitch 26.
Thus, slots 132, 132' are transverse to slots 110, 110'
since ears 120, 122, and 126 and 120', 122' and 126' are
transverse to ears 100a, 100b and 100a', 100b'.

10 A movable pin 134 projects downwardly through top
plate 120, upper ear 126 and bottom ear 122, across slot 132
(Fig. 9) transverse to rod 112. Pin 134 is biased
downwardly and across slot 132 by a spring 136 engaging an
annular flange 137 fixed on pin 134. When pin 134 is raised
15 upwardly against the bias spring 136, the portion of
retaining rod 112 between ears 100a and 100b can be slipped
into slot 132. Pin 134 is then lowered to capture retaining
rod 112 in slot 132 as shown in Figs. 2 and 5. When locked
within slots 132, 132' by pins 134, rod 112 forms a
20 horizontal pivot axis for the entire support frame/plow
assembly with respect to the vehicle on which it is mounted.
The entire assembly may be raised and lowered about rod 112
by a lifting mechanism as described below.

The two catch assemblies 118, 118' are as far
25 apart as the two pairs of outer ears 100 as can be seen from
Fig. 10. Thus, the portions of retaining rod 112 between
ears 100a and 100b and ears 100a' and 100b' can be captured
within the slots 132 in the two catch assemblies 118. It is
desirable to move the two pins 134 in tandem. To do this, a
30 lift bar 138 is connected to the upper ends of both pins 134
and extends between the two catch assemblies 118. When lift

1 bar 138 is raised, pins 134 will be raised in tandem to
allow retaining rod 112 into slots 132 and allow projecting
ears 126 and 122 into slots 110.

5 A shielded cable assembly 140 actuates lift bar
138. Cable assembly 140 includes an L-shaped bracket 142
mounted on mounting bar 116, a cable 144 connected to the
middle of lift bar 138 and extending through an aperture in
the free end of bracket 142, and a cable shield 146 with one
end secured to the free end of bracket 142. The other end
10 of the shielded cable is actuated by a lever or the like
located inside the cab of the vehicle. By activating the
lever, cable 144 will pull lift bar 138 and pins 134
upwardly either to release the plow or to hitch the plow.
In either event, it can be seen that hitching or unhitching
15 the plow is quite simple and can be accomplished by the
vehicle driver from his driver's position. In fact, there
are only two other connections between the plow and the
vehicle besides the one between first hitch 24 and second
hitch 26, namely, the two hydraulic connections in the
20 hydraulic lines for hydraulic cylinders 34, 34'. One would
normally use a conventional quick-disconnect fluid connector
in the hydraulic lines between the vehicle and the hydraulic
cylinders to make hitching and unhitching the plow as simple
as possible.

25 Trip bias mechanism 58 is also connected to
retaining rod 112. Trip bias mechanism 58 includes
turnbuckle 64 connected to attachment rod 56 in cowling 18,
a spring gang plate 148 connected to the other end of
turnbuckle 64, and a series of two to five parallel trip
30 springs 150 connected between gang plate 148 and retaining
rod 112 depending on the trip tension desired. When the

1 plow is being pushed forwardly and the blade strikes an
object, the blade and the cowling will pivot about rod 112
from the first, vertical position shown in Fig. 4 toward or
to the second, tripped position illustrated in Fig. 5,
5 pulling turnbuckle 64 and stretching trip springs 150. When
the object is cleared, trip springs 150 will pull the
cowling and the blades back to the vertical position.

Plow 10 can be pivotally raised about an axis
formed by rod 112 in slots 132, 132' such that blade 12 does
10 not touch the ground by a vertical lifting chain 152 (Fig.
1) and a conventional lifting apparatus 154 mounted on the
front of vehicle 22. Lifting apparatus includes a fluid
cylinder 156 which raises chain 152. Cylinder 156 is
operated through conventional valving by the same
15 fluid/hydraulic pump on the vehicle which operates cylinders
34, 34'. When chain 152 is lifted, it pulls frame 20 by a
loop 158 (Figs. 4 and 5) welded to frame 20, causing frame
20 to pivot about retaining rod 112 in slots 132, 132'.

It can be seen that the hinge employed in the
20 snowplow of the present invention is greatly reinforced by
an elongated piece of folded metal forming an elongated apex
between two apex plate portions of the cowling. This
strengthens the hinge against bending and increases the life
of the plow such that an articulated snowplow can be
25 constructed in a relatively simple fashion from ordinary
sheet metal. Furthermore, the trip bias mechanism of the
present invention can be adjusted to increase or decrease
the trip force required to trip the plow, without having to
compress springs, which in many prior art designs limits the
30 movement of the plow from the untripped to the tripped
positions. The tension on the trip bias mechanism of the

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1 present invention can be adjusted with a turnbuckle which
increases the length of the springs rather than compressing
them or by adding or removing tension springs.

5 While one form of the invention has been shown and
described, other embodiments will now be apparent to those
skilled in the art. Therefore, it will be understood that
the embodiments shown in the drawings and described above
are merely for illustrative purposes and are not intended to
limit the scope of the invention which is defined by the
10 claims which follow.

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THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A hinged snowplow for vehicles comprising a support frame for attachment to a vehicle, said support frame having a fixed end mounted on said vehicle and a free end; a support assembly pivotally secured to and extending from said free end; a pair of plow blades pivotally secured to and extending from said support assembly; stop means connected to said support assembly and engageable with said support frame to limit the pivotal movement of said support assembly about said frame between a first and a second position; said support assembly having two parallel plate means rearwardly extending from a leading edge, said edge being vertical when said support assembly is in said first position; pivot means extending between said leading edge plate means and said frame free end for pivotally securing said support assembly to said free end of said frame such that said support assembly is pivotable in a generally vertical plane about said free end of said frame; said support assembly further including hinge means secured to and extending along said leading edge, said blades being mounted on said support assembly by said hinge means; trip bias means between said frame and support assembly to bias said support assembly to said first position where said blades are positioned for plowing, said support assembly being rotatable against said trip bias means toward said second position when said blades hit an obstacle.

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2. The snowplow as recited in claim 1, wherein said trip bias means is mounted so as to extend in length when said support assembly and blades pivot from said first toward said second positions.

3. The snowplow as recited in claim 2, wherein said trip bias means includes a trip coil spring which is stretched when said support assembly and blades pivot from said first to said second positions.

4. The snowplow as recited in claim 3, wherein said trip bias means further includes trip spring extension adjustment means.

5. A hinged snowplow for vehicles comprising a support frame for attachment to a vehicle, said support frame having a free end; a cowling pivotally secured to said free end; a pair of plow blades pivotally secured to and extending from said cowling; first stop means connected to said cowling and engageable with said support frame to limit the pivotal movement of said cowling about said frame to a first position; second stop means connected with said cowling and engageable with said support frame to limit the pivotal movement of said cowling about said frame to a second position; said cowling including two apex plate means for supporting plow blades

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thereon, said apex plate means forming an elongated vertical apex when said cowling is in said first position and having portions extending away from said apex and receiving said free end of said frame therebetween; pivot means extending between said apex plate means and said frame free end for pivotally securing said cowling to said free end of said frame such that said cowling is pivotable in a generally vertical plane about said free end of said frame; said cowling further including hinge means secured to and extending along said apex, said blades being mounted on said cowling by said hinge means; trip bias means between said frame and cowling to bias said cowling to said first position where said blades are positioned for plowing, said cowling being rotatable against said trip bias means toward said second position when said blades hit an obstacle.

6. The snowplow as recited in claim 5 wherein said frame is T-shaped with the leg of said T comprising said free end, and the arms of said T being mounted to the vehicle.

7. The snowplow as recited in claim 6 wherein said free end is received within said cowling, and said first stop means including stop plate means horizontally disposed in said cowling when said cowling is in said first position so as to abut said T frame leg and prevent rotation of said cowling and blades beyond said first position away from said second position.

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8. The snowplow as recited in claim 7 wherein said second stop means comprises a bottom plate on said cowling.
9. The snowplow as recited in claim 7 which further includes an attachment rod mounted on said cowling to which said bias means is attached, said attachment rod and stop plate means being located above the point of pivotal attachment of said cowling to said free end.
10. The snowplow as recited in claim 9 wherein said attachment rod is located above said stop plate means; and a buttress plate is located between and secured to said attachment rod and stop plate means to reinforce said rod against bending from said bias means.
11. The snowplow as recited in claim 7 wherein said cowling includes two substantially parallel wall portions spaced from each other, each extending from one of said apex plate portions, said stop plate means being located between said parallel wall portions.
12. The snowplow as recited in claim 11 wherein said cowling further includes a back plate which extends between and beyond the sides of said parallel wall portions, forming reinforcing wing members on either side of said cowling, and gusset members extending between said wing members and said parallel wall portions to reinforce said wall portions.
13. The snowplow as recited in claim 12 wherein said gusset members are located adjacent the point of pivotal

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attachment of said cowling to said free end.

14. The snowplow as recited in claim 12 wherein said back plate includes an opening through which said leg of said T-frame projects, said leg being located between and pivotally secured to said parallel wall portions.

15. The snowplow as recited in claim 5 wherein said trip bias means is mounted, so as to extend in length when said cowling and blades pivot from said first toward said second positions.

16. The snowplow as recited in claim 15 wherein said trip bias means includes a trip coil spring which is stretched when said cowling and blades pivot from said first to said second positions.

17. The snowplow as recited in claim 16 wherein said trip bias means further includes trip spring tension adjustment means.

18. The snowplow as recited in claim 17 wherein said trip spring tension adjustment means includes a turnbuckle.

19. The snowplow as recited in claim 1 or 5 including attachment means for attaching said snowplow to a vehicle, said attachment means including first hitch means for mounting on the vehicle, and second hitch means mounted on said support frame for connection to said first hitch means; at least one of said first and second hitch means including projecting means for mounting said snowplow on the vehicle, the other of said

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first and second hitch means including slot means forming a slot for receiving said projecting means when said two hitch means are hitched together; one of said slot means and projecting means including movable pin means for locking said projecting means in said slot means for locking said two hitch means together.

20. The snowplow of claim 19 wherein said projecting means includes at least one pair of spaced members forming a second slot; said slot means having a rod extending thereacross for receipt in said second slot between said spaced members of said projecting means.

21. The snowplow of claim 20 wherein said slot means include at least one pair of spaced members forming a first slot; said spaced members forming said first slot being oriented transverse to said spaced members forming said second slot; said rod extending transverse to said spaced members of said first slot.

22. The snowplow of claim 20 wherein said movable pin means is mounted on said spaced members forming said second slot for movement therebetween across said second slot to lock said rod when received in said second slot.

23. The snowplow of claim 22 wherein said projecting means is on said first hitch means and said slot means is on said second hitch means.

24. The snowplow as recited in claim 22 wherein said

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movable pin comprises a spring biased pin and a spring engaging said pin, said pin being movable against the bias of said spring out of said second slot.

25. The snowplow as recited in claim 19 including remote actuation means to move said movable pin.

26. The snowplow as recited in claim 25 wherein said remote actuation means includes a shielded cable; said shielded cable including a control lever adapted for mounting in the cab of the vehicle for operation by the vehicle drive.

27. The snowplow of claim 19 wherein said slot means includes a rod extending thereacross for receipt in said projecting means, said movable pin means engaging said rod to lock said projecting means in said slot means; said rod forming a pivot axis by which the entire snowplow and support frame may be pivoted with respect to the vehicle.

28. The snowplow attachment means as recited in claim 19 wherein each of said projecting means and slot means includes two slots, each of the two slots on said projecting means being receivable within a slot of said slot means, one of said projecting means and slot means having a rod extending across both of its slots, said movable pin means being on the other of said projecting means and slot means and including two movable pins, each of which is movable across one of said slots on said slot means, and means for moving said movable pins in tandem

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such that said movable pins will simultaneously release said rod.

29. The snowplow as recited in claim 28 wherein said means for moving said movable pins includes connection means which connects said two movable pins, and remote actuation means associated with said connection means for moving said connection means and movable pins in tandem.

30. The snowplow as recited in claim 28 wherein each of said slots is formed between a pair of ears, each of said ears having a portion which angles away from the ear with which it is paired so as to form a widened, tapering mouth portion for each of said slots to guide said projecting means into said slots.

31. The snowplow attachment means as recited in claim 30 wherein said rod extends across both of said slots and between both of said pairs of ears on the said one of said projecting means and slot means; said trip bias means being connected to said rod.

32. The snowplow as recited in claim 31 wherein said frame is T-shaped with the leg of said T comprising said free end, and the arms of said T being mounted to the vehicle.

33. The snowplow as recited in claim 32 wherein said projecting means is associated with the arms of said T-frame and said ears of said projecting means extend outwardly from said T-frame arms.

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34. Attachment means for mounting an implement such as a snowplow having a support frame onto a vehicle, comprising:

first hitch means for mounting on the vehicle and

second hitch means mounted on said support frame for connection to said first hitch means; at least one of said first and second hitch means including slotted projecting means for mounting said implement on a vehicle, the other of said first and second hitch means including slot means forming a first slot for receiving said slotted projecting means when said two hitch means are hitched together; said slotted projecting means including a free end adapted to extend into said first slot and spaced means for forming a second slot; said first and second slots opening generally horizontally and toward one another such that said projecting means may be moved into said slot means; said slot means including pivot axle means forming a pivot axis received in said second slot for allowing pivotal movement of said entire implement and support frame about said pivot axis with respect to said vehicle when said two hitch means are hitched together; one of said slot means and slotted projecting means including movable pin means for locking said slotted projecting means in said slot means for locking said two hitch means together; said movable pin means being positioned generally vertically adjacent said free end of said projecting means such that it locks behind said pivot axle means when said pivot axle means is received in said second slot.

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35. Attachment means for mounting an implement such as a snowplow having a support frame onto a vehicle, comprising:

first hitch means for mounting on the vehicle and second hitch means mounted on said support frame for connection to said first hitch means; at least one of said first and second hitch means including projecting means for mounting said implement on a vehicle, the other of said first and second hitch means including slot means forming a first slot for receiving said projecting means when said two hitch means are hitched together; one of said slot means and projecting means including movable pin means for locking said projecting means in said slot means to hold said two hitch means together; said projecting means including a free end adapted to extend into said first slot and at least one pair of spaced members forming a second slot; said first and second slots opening generally horizontally and toward one another such that said projecting means may be moved into said slot means; said slot means having a rod extending thereacross for receipt in said second slot between said spaced members of said projecting means; said movable pin means being positioned generally vertically adjacent said free end of said projecting means such that it locks behind said rod when said rod is received in said second slot.

36. The attachment means of claim 35 wherein said slot means include at least one pair of spaced member forming said

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first slot; said spaced members forming said first slot being oriented transverse to said spaced members forming said second slot, said rod extending transverse to said spaced members of said first slot.

37. The attachment means of claim 35 wherein said movable pin means is mounted on said spaced members forming said second slot for movement therebetween across said second slot to lock said rod when received in said second slot.

38. The attachment means of claim 37 wherein said projecting means is on said first hitch means and said slot means is on said second hitch means.

39. The attachment means as recited in claim 37 wherein said movable pin comprises a spring biased pin and a spring engaging said pin, said pin being movable against the bias of said spring out of said second slot.

40. The attachment means as recited in claim 34 including remote actuation means to move said movable pin means.

41. The attachment means as recited in claim 40 wherein said remote actuation means includes a shielded cable.

42. Attachment means for mounting an implement such as a snowplow having a support frame onto a vehicle, comprising:

first hitch means for mounting on the vehicle and second hitch means mounted on said support frame for connection to said first hitch means; at least one of said first and second hitch means including projecting means for mounting said

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implement on a vehicle, the other of said first and second hitch means including slot means forming a first slot for receiving said projection means when said two hitch means are hitched together; one of said slot means and projecting means including movable pin means for locking said projecting means in said slot means to hold said two hitch means together; said projecting means including a free end adapted to extend into said first slot and at least one pair of spaced members forming a second slot; said first and second slots opening generally horizontally and toward one another such that said projecting means may be moved into said slot means; said slot means including a rod extending thereacross for receipt in said second slot of said projecting means; said movable pin means being positioned generally vertically adjacent said free end of said projecting means and engaging behind said rod to lock said projecting means in said slot means when said rod is received in said second slot; said rod forming a pivot axis by which the entire implement and support frame may be pivoted with respect to the vehicle.

43. The attachment means as recited in claim 34 wherein each of said projecting means and slot means includes two slots, each of the two slots on said projecting means being receivable within a slot of said slot means, one of said projecting means and slot means having a rod extending across both of its slots, said movable pin means being on the other of

said projecting means and slot means and including two movable pins, each of which is movable across one of said slots on said slot means, and means for moving said movable pins in tandem such that said movable pins will simultaneously release said rod.

44. The attachment means as recited in claim 43 wherein said means for moving said movable pins includes connection means which connects said two movable pins, and remote actuation means associated with said connection means for moving said connection means and movable pins in tandem.

45. The attachment means as recited in claim 43 wherein each of said slots is formed between a pair of ears, each of said ears having a portion which angles away from the ear with which it is paired so as to form a widened, tapering mouth portion for each of said slots to guide said bars into said slots.

46. The attachment means as recited in claim 45 wherein said rod extends across both of said slots and between both of said pairs of ears on the said one of said projecting means and slot means; trip bias means for biasing a pivotal implement into an upright position on the support frame being connected to said rod.

47. The attachment means as recited in claim 46 wherein said frame is T-shaped with the leg of said T comprising said free end, and the arms of said T being mounted to the vehicle.

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48. The attachment means as recited in claim 47 wherein said projecting means is associated with the arms of said T-frame, and said ears of said projecting means extend outwardly from said T-frame arms.

49. A hinged snowplow for vehicles, comprising:
a support frame for attachment to a vehicle, said support frame having a free end;

a stamping having angled wall portions forming an elongated apex, said angled wall portions extending away from said apex and receiving said free end of said frame therebetween;

pivot means extending between portions of said angled wall portions and said framed end for pivotally securing said stamping to said free end of said frame such that said stamping is pivotable in a generally vertical plane about said free frame end;

hinge means mounted along said apex;

a pair of blade sections attached to said hinge means;

biasing means for biasing said stamping and blade sections to a first pivoted position for plowing, said bias means being yieldable when overcome by the force of the pivotal movement of said blade sections and stamping toward a second position about said free end.

50. An improved snowplow, comprising:
a snowplow blade;

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a frame having a leg member with a free end and an arm member at the end of said leg member which is opposite to said free end;

a cowling including two apex plate means for supporting said snowplow blade thereon, said apex plate means forming an elongated vertical apex and having portions extending away from said apex and receiving said free end of said frame therebetween;

pivot means extending between said apex plate means and said frame free end for pivotally securing said cowling to said free end of said frame such that said cowling is pivotable in a generally vertical plane about said free end of said frame; said cowling further including hinge means secured to and extending along said apex, said blade being mounted on said cowling by said hinge means;

biasing means connected to and between said arm member and said cowling for biasing said cowling and blade to a first plowing position; and

hitch means associated with said arm member for mounting said snowplow on a vehicle, whereby when said blade strikes a fixed object while being pushed by a vehicle, said blade will pivot against the bias of said biasing means from said first position toward a second position to pass over the object.

51. The improved snowplow as recited in claim 50 further

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including at least one gusset between said leg and arm members to reinforce said frame.

52. The improved snowplow as recited in claim 50 wherein said blade is hinged blade with hinge means located at the point of pivotal attachment of said free end and said blade.

53. The improved snowplow as recited in claim 52 wherein, said hinge means are mounted on said cowling.

54. The improved snowplow as recited in claim 50 wherein said hitch means includes a slotted means extending from said arm member with a bar across said slotted means to receive an attachment member on said vehicle in said slotted means behind said bar.

55. The improved snowplow as recited in claim 54 wherein said biasing means is connected to and between said bar and said blade.

56. A hinged snowplow for vehicles, comprising:
a support frame for attachment to a vehicle, said support frame having a free end;
a support assembly having wall portions joining to form an elongated vertical support section, said wall portions extending away from said vertical support section;
pivot means extending between portions of said wall portions and said frame end for pivotally securing said support assembly to said free end of said frame such that said support

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assembly is pivotable in a generally vertical plane about said free frame end;

hinge means secured to and extending along said vertical support section;

a pair of plow blade sections attached to said hinge means;

biasing means for biasing said support assembly and blade sections to a first pivoted position for plowing, said means being yieldable when overcome by the force of the pivotal movement of said blade sections and support assembly toward a second position about said free end.



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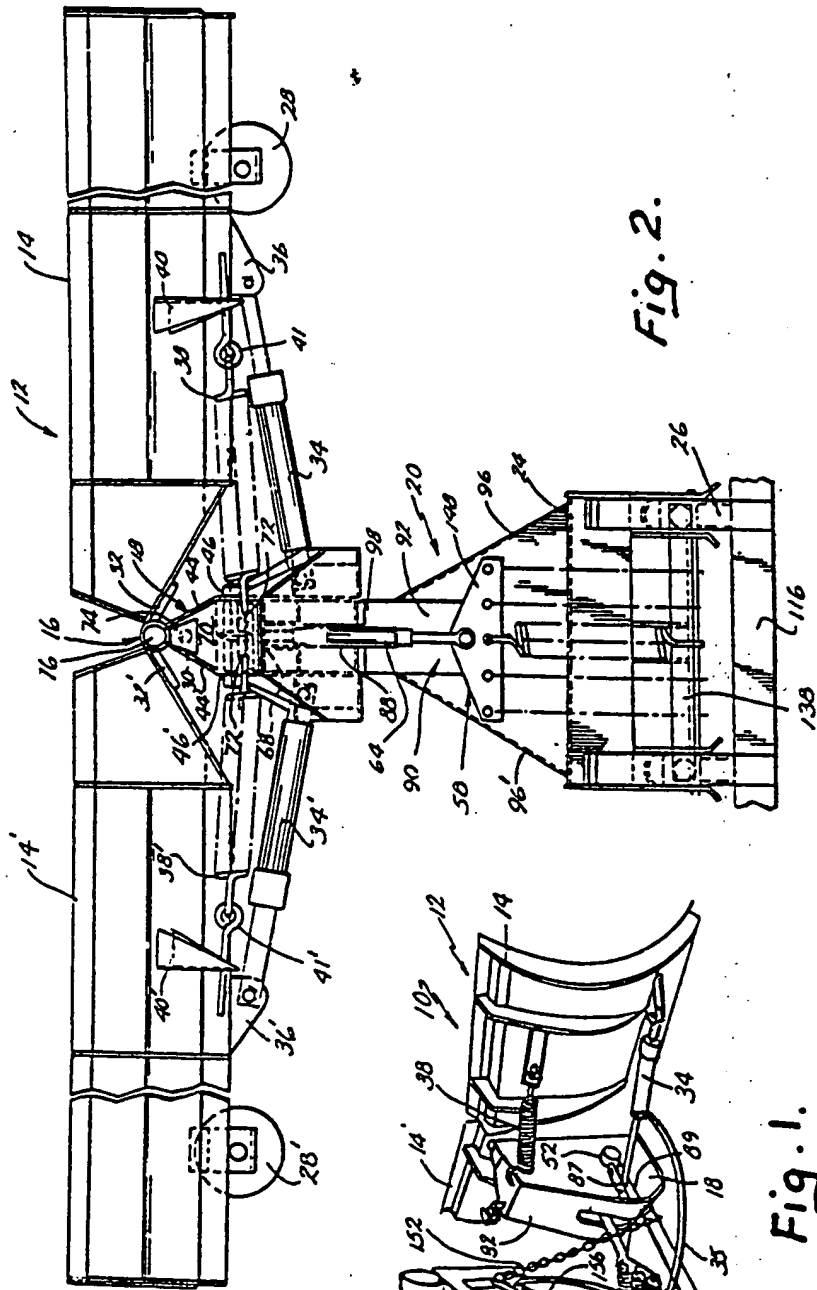


Fig. 1.

Fig. 2.

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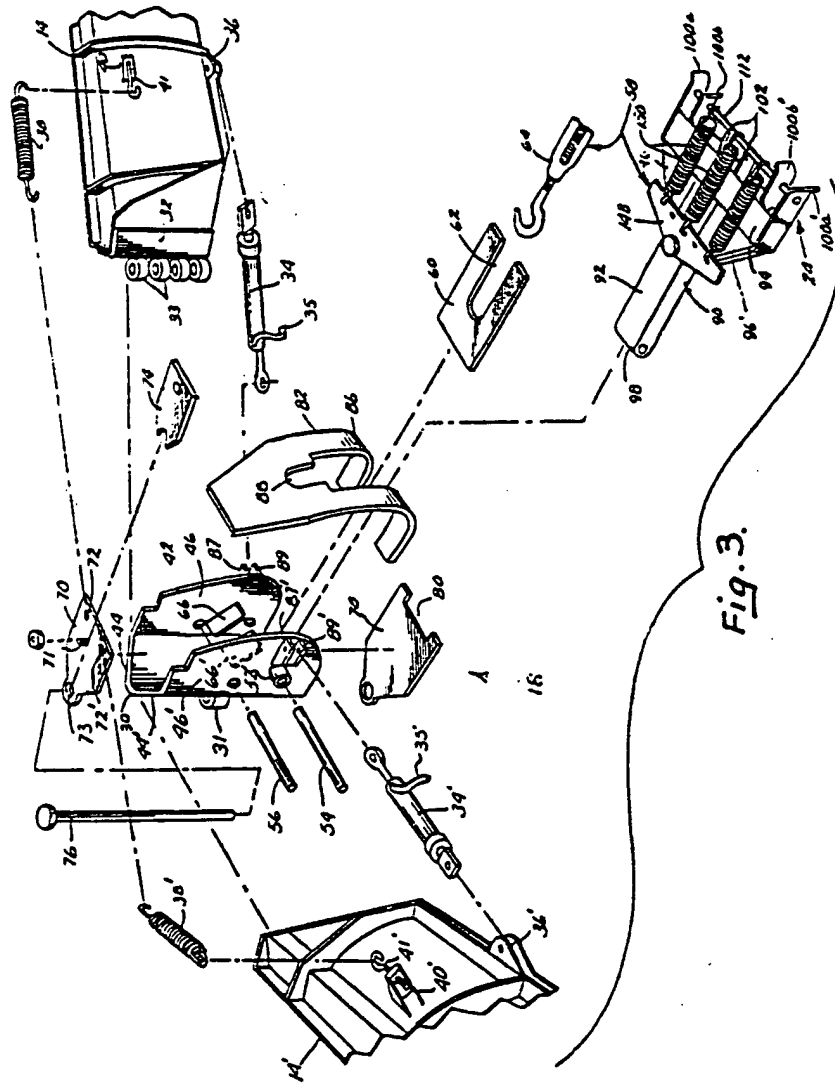


Fig. 3.

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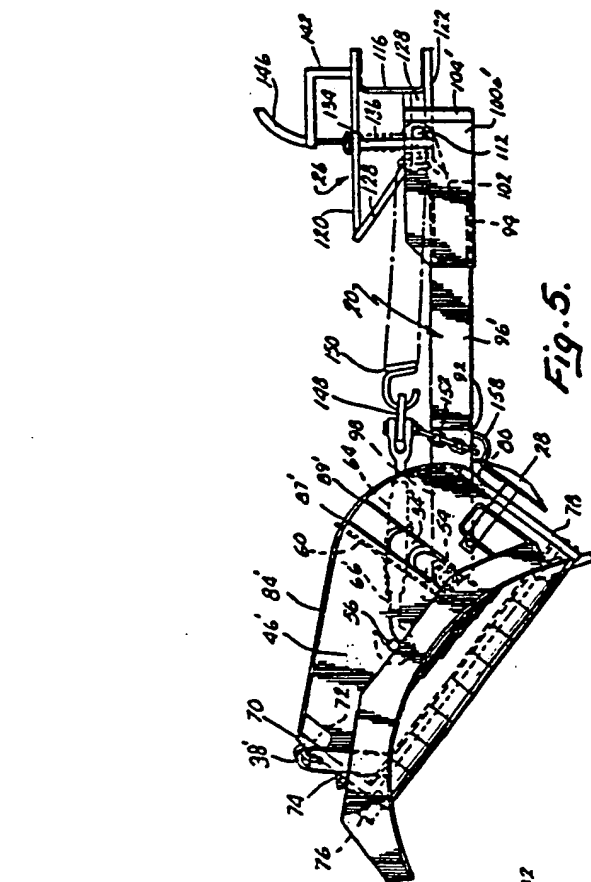


Fig. 4A.

Fig. 5.

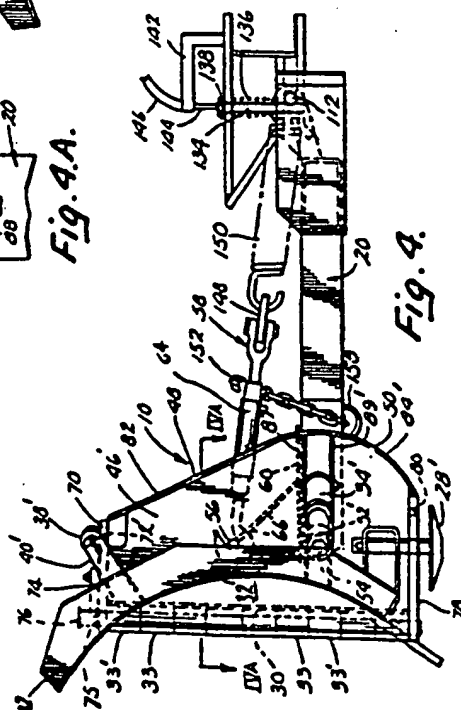


Fig. 4.

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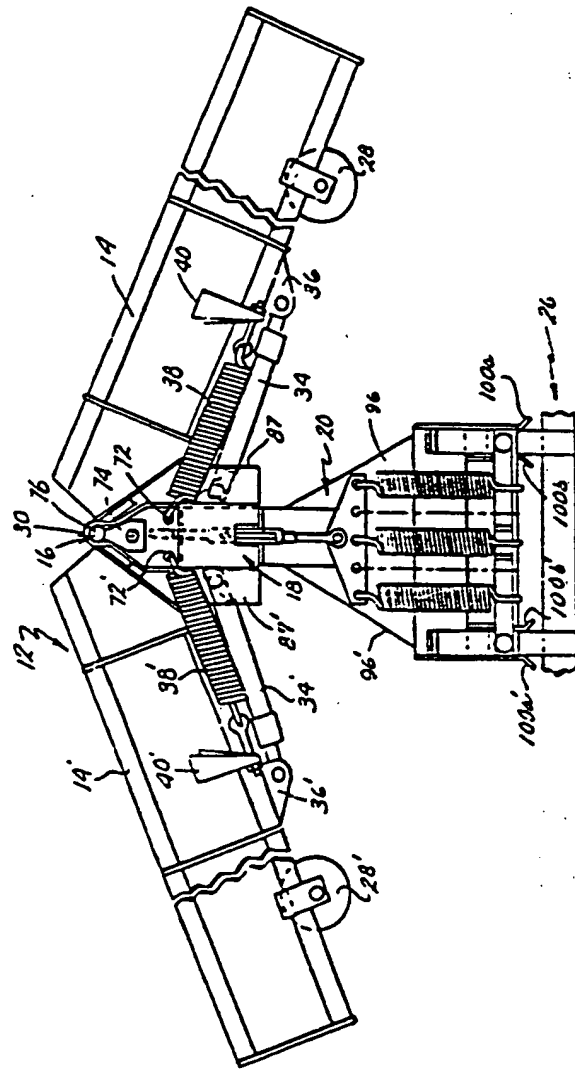


Fig. 6.

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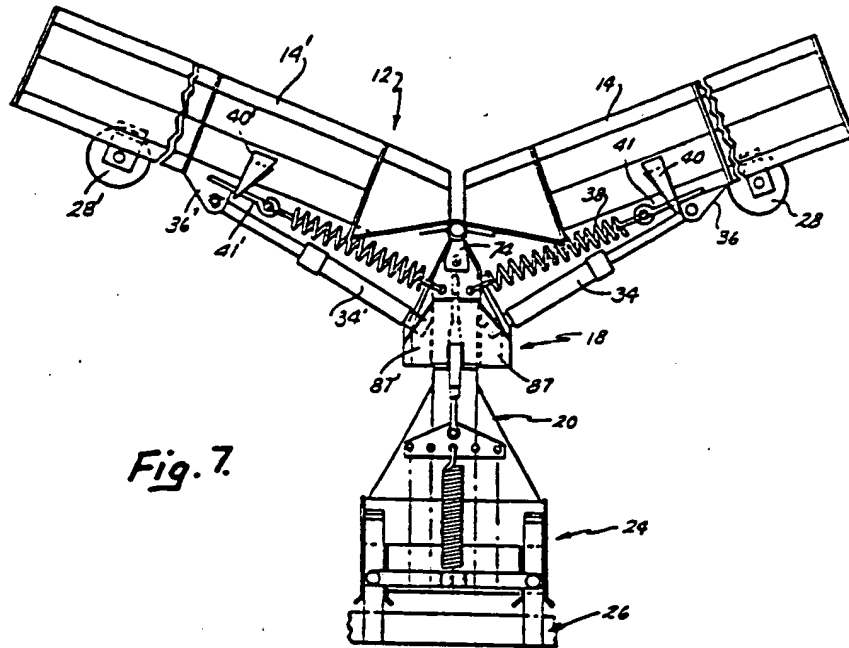


Fig. 7.

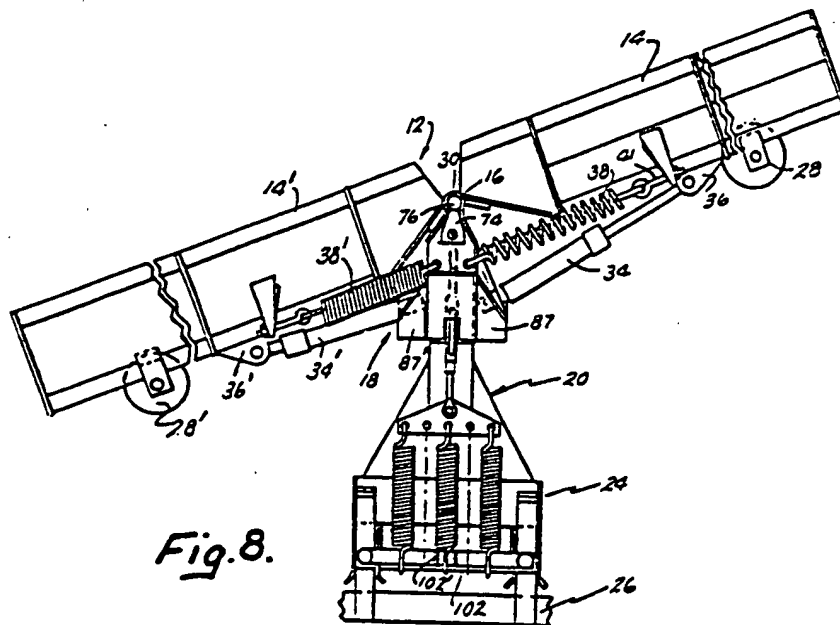


Fig. 8.

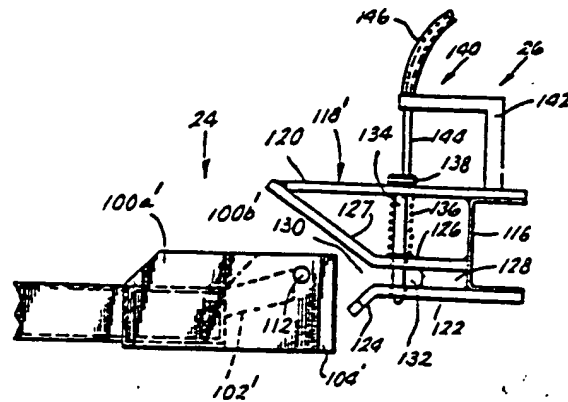


Fig. 9.

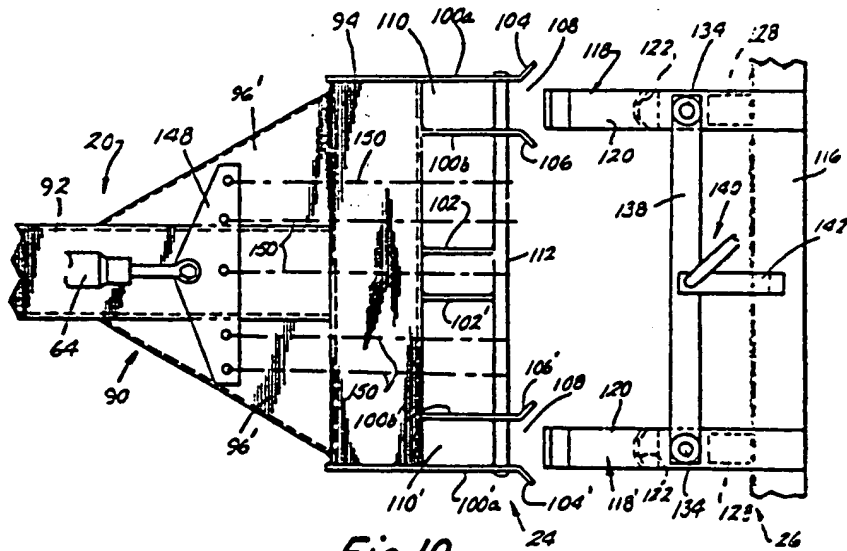


Fig. 10.

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